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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/589,079
Filing Date: August 11, 2006
Appellant(s): SCHIESSL, GERHARD

Michael P. Byrne
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed November 12, 2010 appealing from the Office action mailed June 23, 2010.

(1) Real Party in Interest

The examiner has no comment on the statement, or lack of statement, identifying by name the real party in interest in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The following is a list of claims that are rejected and pending in the application:

Claims 26-44 are pending and rejected in the instant application.

(4) Status of Amendments After Final

The examiner has no comment on the appellant's statement of the status of amendments after final rejection contained in the brief.

(5) Summary of Claimed Subject Matter

The examiner has no comment on the summary of claimed subject matter contained in the brief.

(6) Grounds of Rejection to be Reviewed on Appeal

The examiner has no comment on the appellant's statement of the grounds of rejection to be reviewed on appeal. Every ground of rejection set forth in the Office action from which the appeal is taken (as modified by any advisory actions) is being maintained by the examiner except for the grounds of rejection (if any) listed under the subheading "WITHDRAWN REJECTIONS." New grounds of rejection (if any) are provided under the subheading "NEW GROUNDS OF REJECTION."

(7) Claims Appendix

The examiner has no comment on the copy of the appealed claims contained in the Appendix to the appellant's brief.

(8) Evidence Relied Upon

US 3,337,376	Grange	08-1967
US 3,057,050	Hodge et al.	10-1962
US 3,891,474	Grange	06-1975
US 2002/0069506	Brodt et al.	06-2002

Schmoeckel, D. "Metal Forming (Warm): Comparison with Hot and Cold Forming," Encyclopedia of Materials: Science and Technology, Vol. 6, Eds. Buschow et al., Elsevier, 2001, pp. 5437-5439.

Hassell, Peter A. and Nicholas V. Ross, "Induction Heat Treating of Steel," Vol. 4, ASM Handbook, ASTM International, 2002.

Smith, John W. "Continuous Furnaces," Vol. 4, ASM Handbook, ASTM International, 2002.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim 38 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor, at the time the application was filed, had possession of the claimed invention. Specifically, there is no support in the specification for the limitation that the second manufacturing process is continuous.

Claims 26-29 and 32-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grange (US 3,337,376, hereafter Grange '376) in view of Schmoeckel ("Metal Forming (Warm): Comparison with Hot and Cold Forming," Vol. 6, *Encyclopedia of Materials*) and Hodge et al. (US 3,057,050), and optionally further in view of Grange (US 3,891,474, hereafter Grange '474).

Regarding claims 26 and 32, Grange '376 teaches a heat treatment method for enhancing the mechanical properties of hypereutectoid steels, including tool steels and hardenable steels (col. 1, lines 39-48). The method comprises the following steps: (1) Austenitizing the steel (col. 2, lines 6-16); (2) Quenching the steel to transform the

austenite to bainite (col. 2, lines 17-28); (3) Cooling the steel to room temperature (col. 2, lines 29-31); and (4) Reheating the steel to 1425-1600°F (774-871°C) to austenitize the steel (col. 2, lines 32-39; col. 2, lines 71-72 to col. 3, lines 1-6).

Still regarding claims 26 and 32, Grange '376 teaches that the steels therein may be used to manufacture tools (col. 1, lines 46-48), but does not teach forming the steel while heated to form a tool (component). However, it is well known in the art to form components while in a heated state, as evidenced by Schmoeckel. Schmoeckel teaches that warm forming of steel, which generally occurs at temperatures between 600°C and 900°C, is advantageous because the flow stress of the material is lower, thus enabling the forming operation to be carried out with relative ease (p. 5438, paragraph 4). Therefore, it would have been obvious to one of ordinary skill in the art to have formed the tool steel of Grange '376 while in a heated state because doing so would facilitate the forming process due to the lower flow stress needed to overcome to shape the component.

Further regarding claims 26 and 32, the steels of Grange '376 do not have an aluminum coating layer thereon. However, coating steels with aluminum is well known in the art, as evidenced by Hodge et al. Hodge et al. teach that aluminum coatings have multiple beneficial functions such as protecting the substrate steel from undesirable corrosion and oxidation as well as enhancing the aesthetic properties of the surface of the steel (col. 1, lines 20-29). Aluminum coatings may be applied to many types of steels, including structural alloy steels and tool steels (Hodge et al., col. 8, lines 15-21). Thus, it would have been obvious to one of ordinary skill in the art to have

coated the tool steel of Grange '376 with aluminum because aluminum coatings prevent the mechanical properties of the underlying steel from deteriorating as a result of corrosion and oxidation, as taught by Hodge et al.

Regarding the storing step of claim 26 and claim 39, Grange '376 teaches that the steel may be cooled to room temperature (col. 2, lines 29-31, 68-70). Grange '376 does not explicitly teach a "storing" step as claimed. However, allowing the steel to cool to room temperature and placing it temporarily aside before re-austenitization, as implicitly disclosed by Grange '376 in the oil quench examples (col. 3, lines 62-64; col. 4, lines 31-35), broadly translates into storage step, as one of ordinary skill in the art would expect the steel to have sit idle for some period of time before being rapidly heated in the second heating step.

Still regarding the storing step of claim 26 and claim 39, Grange '376 does not explicitly teach the claimed "storing" step. However such a step is well known in the art, as evidenced by Grange '474. Grange '474 teaches a double austenitization heat treatment wherein the steel is carburized above the A_3 (fully austenitized) temperature, allowed to cool to room temperature, stored at room temperature, and then subsequently heated to re-austenitize the steel above the A_3 temperature (FIG. 1; col. 2, lines 46-50; col. 3, lines 12-20). The storing step may be desired for several reasons, such as protecting the cooled steel before it is reheated in the next furnace as the next furnace may be fully occupied or protecting the steel before it is transported by a vehicle to the next processing plant, for example. Therefore, it would have been obvious to one

of ordinary skill in the art to have stored the cooled steel before reheating in the case the steel could not be immediately reheated for at least the aforementioned reasons.

Regarding claims 27 and 29, Grange '376 teaches that the austenitizing treatment of step (1) above occurs for 20 minutes (col. 4, lines 70-75 to col. 5, lines 1-6), which lies within the claimed range. The austenitizing treatment of step (4) above occurs for a maximum time of 5 minutes (col. 3, lines 11-18), which overlaps the claimed range. The overlap between the ranges taught in the prior art and recited in the claims creates a *prima facie* case of obviousness (MPEP § 2144.05).

Regarding claims 28 and 33, Grange '376 in view of Schmoeckel further in view of Hodge et al. do not explicitly teach that the heat treatment of Grange '376 would cause an aluminum coating to increase in thickness during a first heat treatment and then no longer grow during a second heat treatment. However, it has been well established that

> "[w]here the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established" (*In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977)).

See also MPEP § 2112.01. In the present instance, the sequence of heating steps, temperature conditions, and duration of heating times disclosed by Grange '376 are substantially identical to that of the claims. Therefore, it naturally follows that an aluminum coating placed upon the steel of Grange '376 would be expected to grow in the same manner as claimed absent evidence to the contrary.

Regarding new claim 34, it is implicit in Grange '376 and Grange '474 that in order to move the cooled steel to the area in which it is stored (Grange '376 – into or out of oil quenching bucket – col. 3, lines 62-64; col. 4, lines 31-35; Grange '474 – storage area – col. 2, lines 46-50; col. 3, lines 12-20), it would have to be transported.

Regarding new claims 35 and 36, Grange '376 teaches that the first austenitization takes place in one process (col. 2, lines 6-10), and the second rapid re-austenitization takes place in another process (col. 3, lines 19-22). These heating steps are separate heating steps (decoupled).

Regarding new claims 37 and 38, Grange '376 teaches that each heating step is continuous because the heating in each process is not interrupted (first austenitization: col. 2, lines 6-10; col. 3, lines 58-62; second austenitization: col. 3, lines 19-22).

Regarding new claims 40-42, Grange '376 teaches that the first austenitization heating takes place in a furnace of some type (location/facility) (col. 2, lines 6-10; col. 3, lines 58-62), and the second austenitization takes place in a molten salt or lead bath (another location/facility) (col. 3, lines 19-22). Note that facility is interpreted as a place or device that provides a specific service or function.

Claims 30 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grange '376 in view of Schmoeckel and Hodge et al., and optionally in view of

Grange '474, as applied to claim 26 above, and further in view of Hassell et al. ("Induction Heat Treating of Steel," Vol. 4, *ASM Handbooks*).

Regarding claim 30, Grange '376 in view of Schmoeckel and Hodge et al. do not teach heating the sheet to different intensities at different locations. Hassell et al. teach that it is common to heat treat at selected locations of the surface of an alloy order to obtain a part that has varying mechanical properties (Hassell, "Selective Hardening"). A surface with different mechanical properties is sometimes required for applications where, for instance, the loading stresses vary or are uneven (Hassell, "Selective Hardening"). Therefore, it would have been obvious to one of ordinary skill in the art to heat the steel of Grange '376 in view of Schmoeckel and Hodge et al. to different intensities at different locations in order to form a part with varying mechanical properties over its surface, as taught by Hassell et al., for a particular application.

Regarding new claim 44, Grange '376 in view of Schmoeckel, Hodge et al., and optionally in view of Grange '474 teach conducting the second austenitization heating step by induction (inductor) heating (Grange '376, col. 3, lines 19-22), but do not teach the induction heater as being a transport device. Hassell et al. teach that induction heaters may be automated in order to facilitate workhandling of steel workpieces ("Workhandling Equipment," second paragraph). One aspect of the automated apparatus includes moving (transporting) the steel workpiece through the induction field ("Workhandling Equipment," first paragraph). It would have been obvious to one of ordinary skill in the art to have utilized an automatic transport apparatus containing an

induction heater, as disclosed by Hassell et al., in the process of Grange '376 because it would make the process of Grange '376 more efficient.

Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Grange '376 in view of Schmoeckel and Hodge et al. and optionally in view of Grange '474, as applied to claim 26 above, and further in view of Brodt et al. (US 2002/0069506).

Regarding claim 31, Grange '376 in view of Schmoeckel and Hodge et al. do not teach reinforcing the sheet between heat treatment steps. Brodt et al. teach that steel sheets may be reinforced by applying a similar or same steel material onto a base sheet in order to strengthen the base sheet at particular high-pressure points (para. [0050]). Reinforcements are often more desirable than manufacturing a thicker sheet, as reinforcements allow less material to be used, resulting in a sheet that remains strong but is also lightweight (Brodt et al., para. [0003]). Therefore, it would have been obvious to one of ordinary skill in the art to incorporate the reinforcing step of Brodt et al. into the process of Grange '376 in view of Schmoeckel and Hodge et al. because it decreases manufacturing material costs while providing a steel sheet of sufficient strength.

Claim 43 is rejected under 35 U.S.C. 103(a) as being unpatentable over Grange '376 in view of Schmoeckel and Hodge et al., and optionally in view of Grange '474, as applied to claim 42 above, and further in view of Smith ("Continuous Furnaces," Vol. 4, *ASM Handbook*).

Regarding claim 43, Grange '376 in view of Schmoeckel, Hodge et al., and optionally in view of Grange '474 teach that the second austenitization heating step may take place in an induction heater (induction furnace) (Grange '376, col. 3, lines 19-22). Grange '376 is silent as to the type of furnace used in the first austenitization heating step. Smith teaches that continuous furnaces are known in the art for heat treating steel (page 1 of 11). Several advantages of using a continuous furnace include easy adaptability for automated heating, ability to heat large quantities of workpieces, and ability to carry out and reproduce heat treatments with precision and accuracy (Smith, page 1 of 11, paragraphs 1-3). It would have been obvious to one of ordinary skill in the art to have utilized a continuous furnace, as disclosed in Smith, in the method of Grange '376 because a continuous furnace would be able to perform the initial austenitizaiton treatment of Grange quickly, efficiently, and accurately.

(10) Response to Argument

First, Appellant argues that the rejection of claim 38 under the first paragraph of 35 U.S.C. 112 is erroneous because page 3 of the instant specification discloses that the invention can involve decoupling the sequences of a continuous process. In response, the Examiner has reviewed page 3 of the specification and acknowledges that the process of sheet bar forming may be decoupled. But nowhere in the same pertinent portion is it disclosed that the second portion of the manufacturing process is continuous.

Second, Appellant states that Grange '376 teaches that the steel is heated rapidly after it has cooled to room temperature; therefore, the steel is not stored at room temperature for an interval of time. In response, Grange '376 clearly teaches that the steel is cooled to room temperature and re-heated thereafter (col. 2, lines 29-33, 69-72). Inherent in the process of reaching room temperature, the steel would have stayed at room temperature for a finite period of time (i.e., an interval of time). It should be noted that claim 26 does not specify a particular amount of time; therefore, any finite period of time would meet the claim limitation. With respect to the storing step, Grange '376 does not literally utilize the term "storing" in the disclosure. However, allowing the steel to cool to room temperature and placing it temporarily aside before re-austenitization, as implicitly disclosed by Grange '376 in the oil quench examples (col. 3, lines 62-64; col. 4, lines 31-35), broadly translates into storage step, as one of ordinary skill in the art would expect the steel to have sit idle for some finite period of time before being rapidly heated in the second heating step. Therefore, Grange '376 at least teaches cooling and storing steps as claimed.

Third, Appellant argues that Grange '376 teaches away from storing the steel blank because Grange '376 allegedly teaches that immediate re-heating of the quenched steel is desirable in order to minimize the formation of microcracks in the steel. In response, Appellant's argument is not commensurate in scope with the claimed invention. As stated in the above paragraph, allowing the steel to cool to room temperature and placing it temporarily aside before re-austenitization, as implicitly disclosed by Grange '376 in the oil quench examples (col. 3, lines 62-64; col. 4, lines

31-35), broadly translates into storage step, as one of ordinary skill in the art would expect the steel to have sit idle for some period of time before being rapidly heated in the second heating step. Therefore, the storing step is satisfied. It should be noted that claim 26 does not specify a particular amount of storage time nor does the specification define what would constitute storage; therefore, any finite period of time would meet the claim limitation.

Fourth, Appellant argues that Grange '376 does not relate to an aluminum coated steel blank and therefore is not relevant to the patentability of the claimed subject matter. In response, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Note that the reference to Hodge et al., prior art of record, discloses the benefits of coating steel with aluminum.

Fifth, Appellant argues that Grange '474 provides no reason to arrive at the claimed invention because the heat treatment pattern disclosed teaches away from the present invention. In response, the Examiner respectfully disagrees. Grange '474 clearly teaches a heat treatment pattern, wherein steel is heated above the A_3 (austenitizing) temperature, cooled and stored at room temperature, and further heated above the A_3 (austenitizing) temperature (FIG. 1, col. 2, lines 38-53; col. 3, lines 12-24). This heat treatment matches the claimed sequence step for step, and therefore, does not teach away.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Vanessa Velasquez/

Examiner, Art Unit 1733

Conferees:

/ Roy King/

Supervisory Patent Examiner, Art Unit 1733

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